MIRACLE
SOFTWARE SYSTEMS

Google AI Studio: From Gemini Models to Advanced Prompting

Open Lab | Digital Summit 2024

Goal

In this OpenLab, you will learn how to use **Google AI Studio** and explore the **Gemini models**, which are designed for advanced AI tasks.

We will guide you step by step on the following:

- **Setting up and accessing Google AI Studio**
- **Understanding and working with different Gemini models** for tasks like generating text, and images, or working with multimodal content
- **Using the Playground** to experiment and test various AI capabilities
- **Mastering prompting techniques** to interact effectively with AI models and get the best results for tasks like code generation, image creation, and more

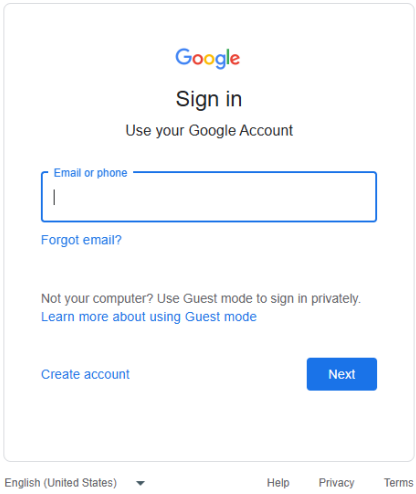
Pre-Requisites

- Google Account

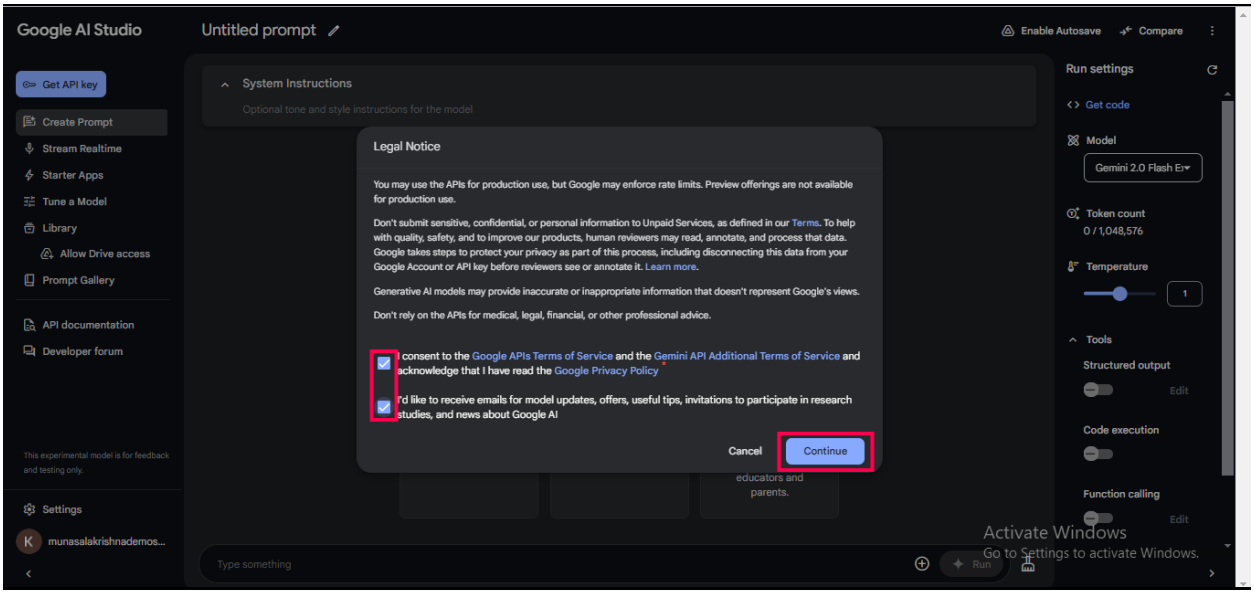
Steps to Get Started

Step 1 | Access Google AI Studio

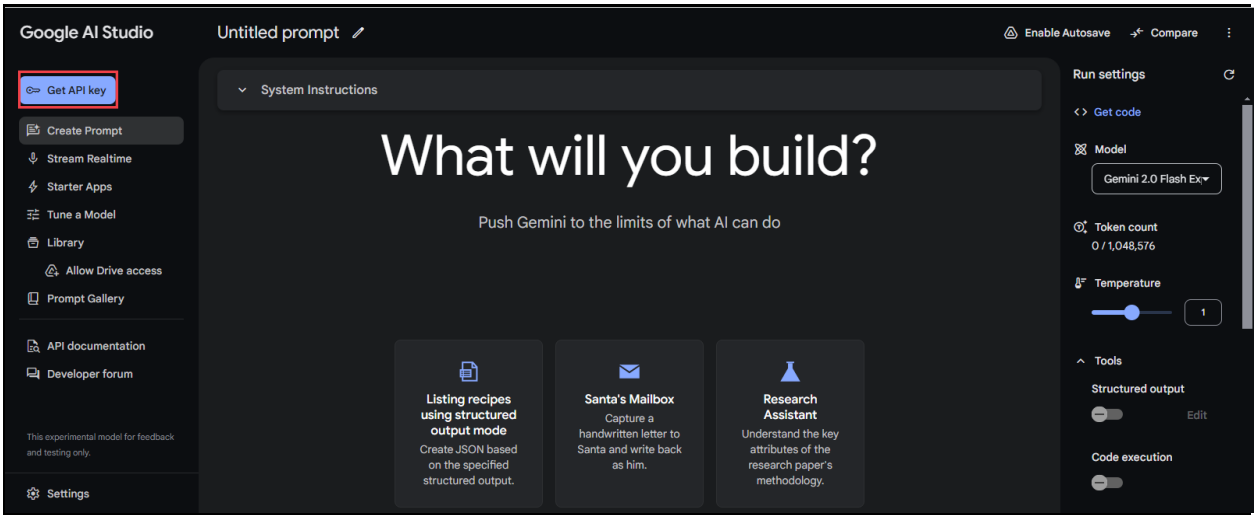
Click on this link to login to Google AI Studio
Log in with your Google Account credentials (If prompted) by entering your email, password and click continue.



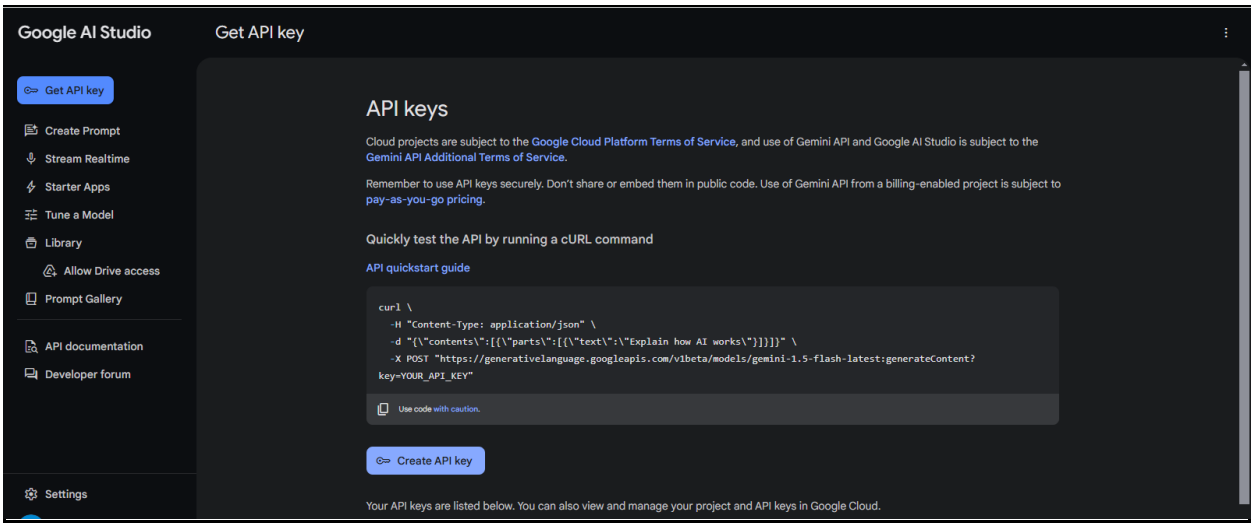
After logging into your **Google Account**, you'll be redirected to the AI Studio Dashboard, where you need to accept the **Terms of Service** and click "**Continue**" to proceed.



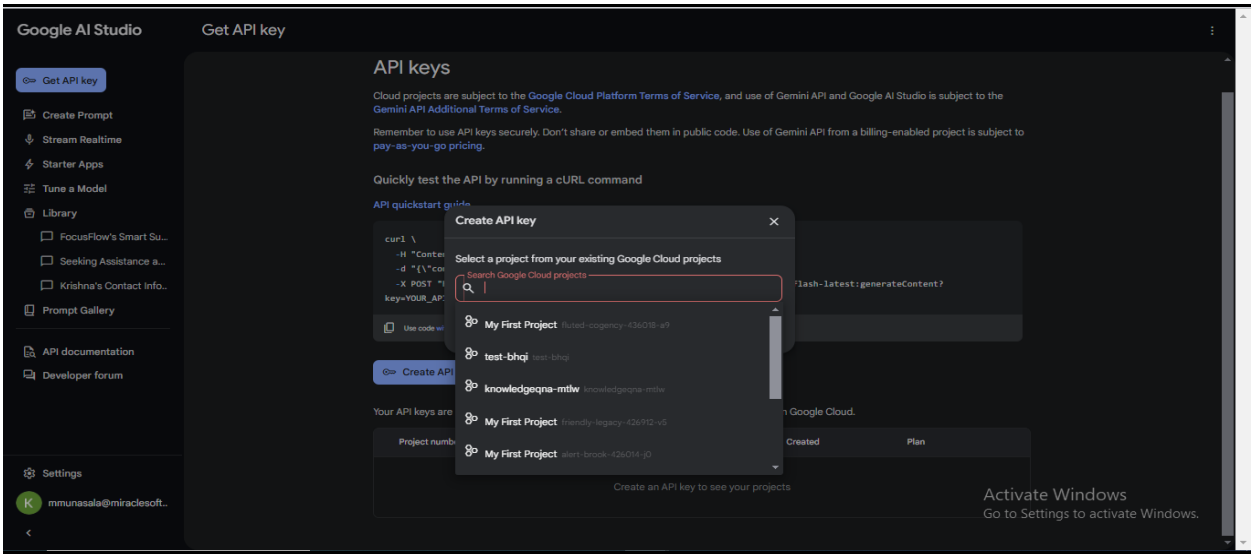
You will then be redirected to the Dashboard.



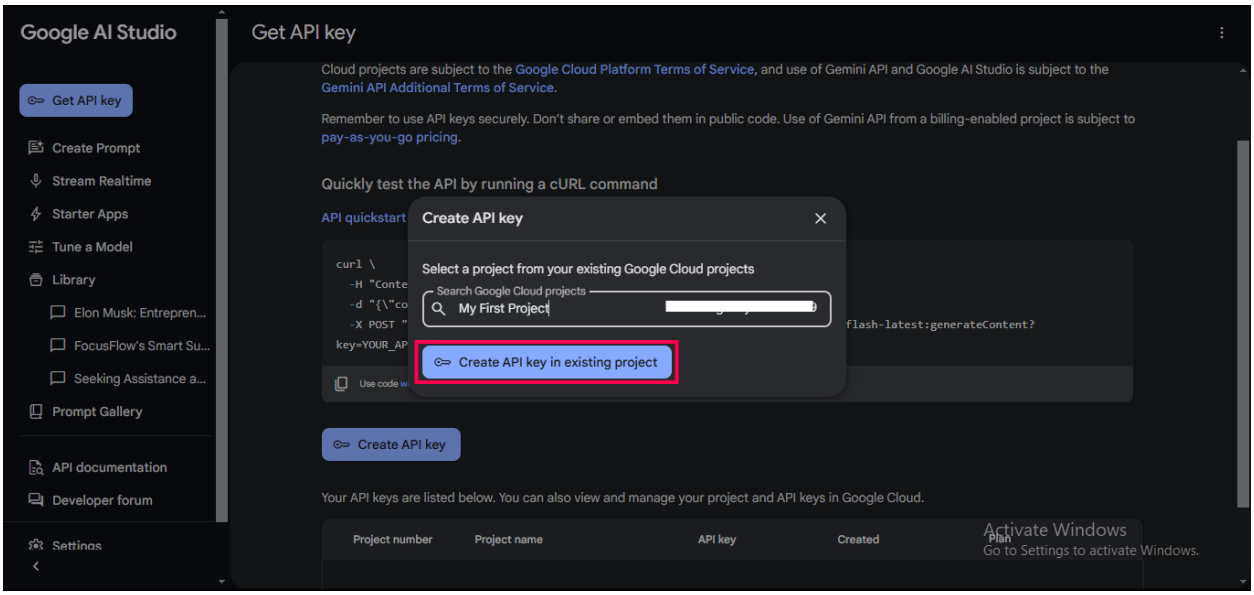
Click on '**Get API Key**' in the top left corner to proceed to the screen shown below.



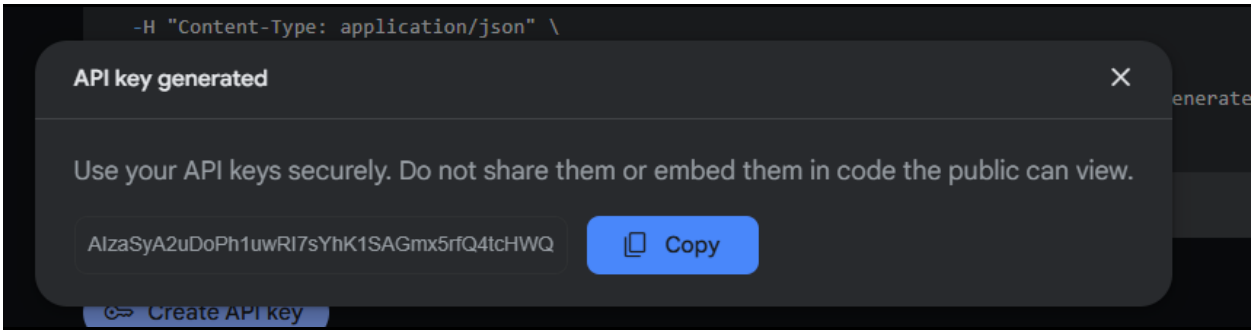
Click on '**Create API Key**' and choose the default or any available project as shown below.



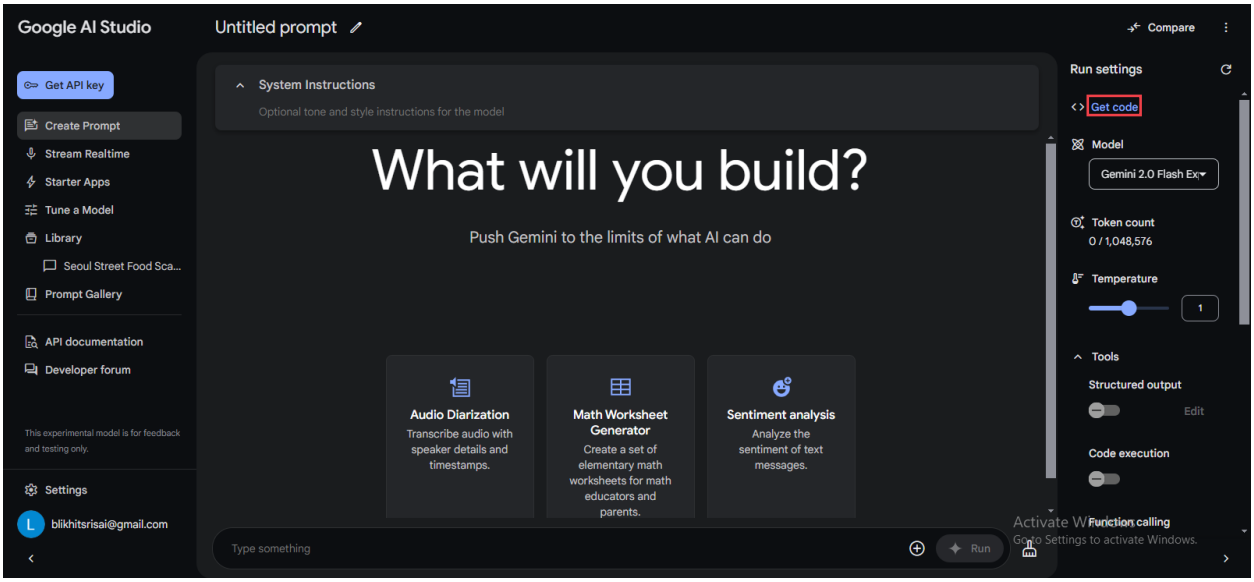
Click on '**Create API Key**' in an existing project to generate a key.



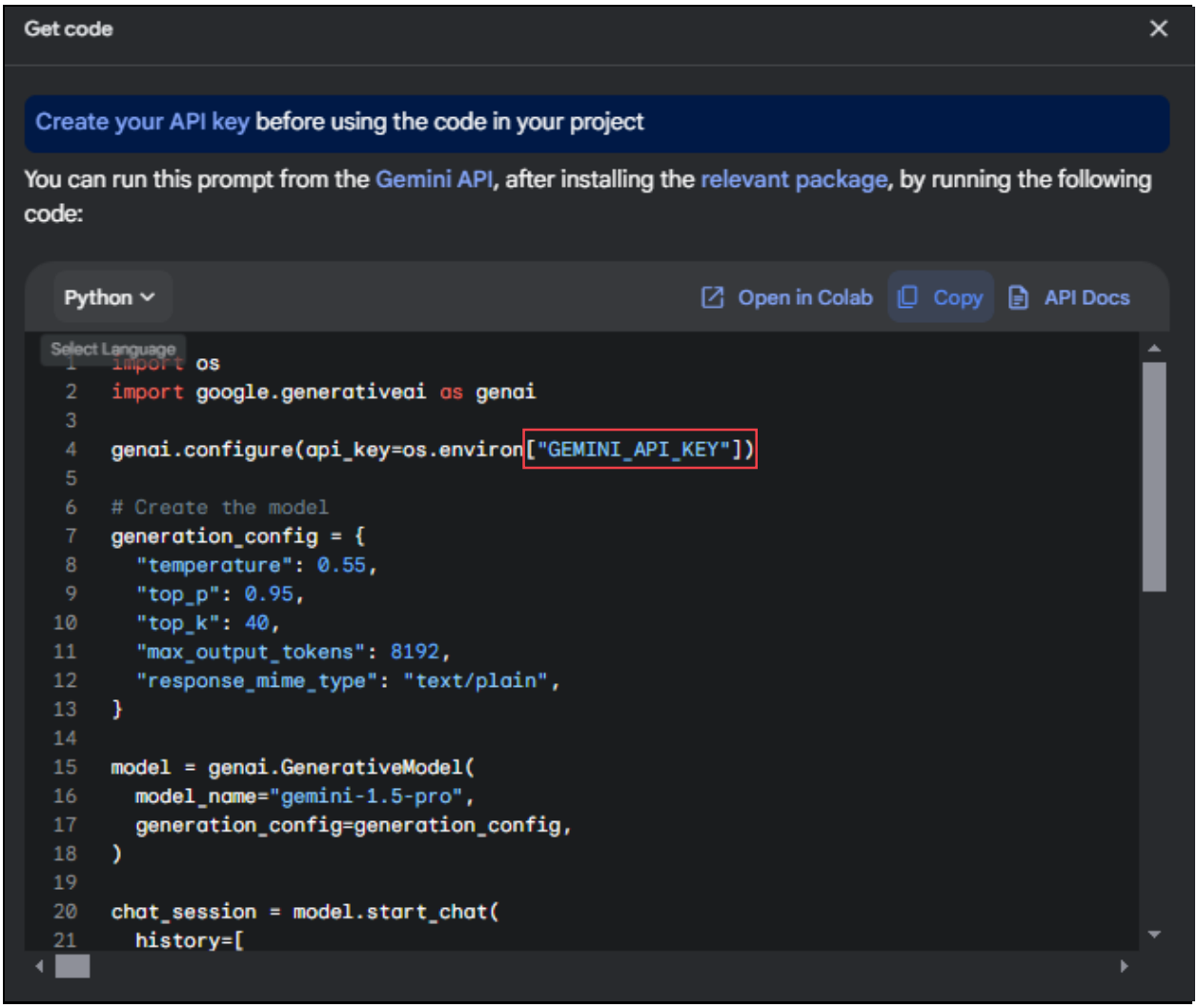
Now you will see the API Key like the one in the below image.



Copy the API key and close the tab. Next, click on the '**Create Prompt**' tab and select the '**Get Code**' option from the right sidebar.



You will now see a screen similar to the one below. Use the copied API key in [Google Colab] or any IDE to interact with the model.



What is LLM?

LLM stands for **Large Language Model**, a type of advanced artificial intelligence (AI) designed to process and generate human-like text. These models use **deep learning techniques** and are trained on massive datasets of text and code. LLMs can perform tasks such as understanding, summarizing, generating, translating language, and even solving problems like code generation or multimodal interactions.

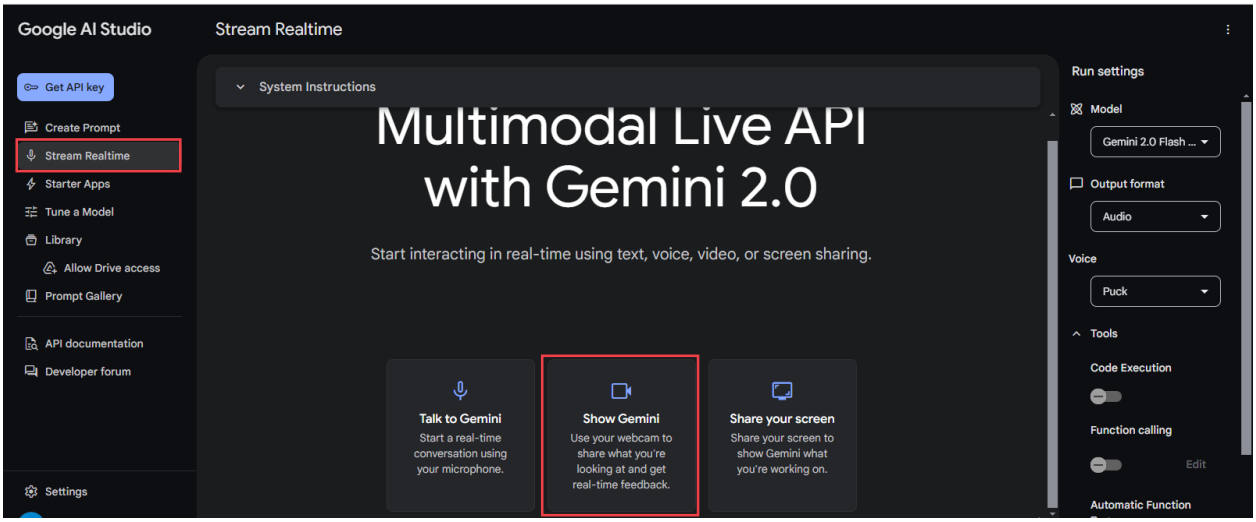
Available LLMs in AI Studio

In Google AI Studio, you can access the following LLMs:

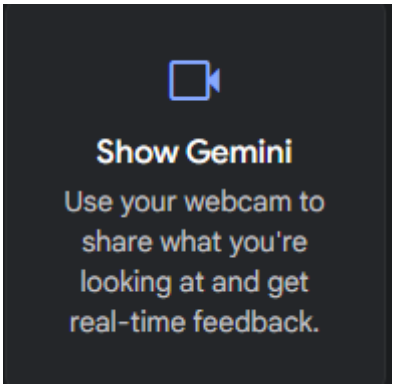
- **Gemini 2.0 Flash Experimental**
- **Gemini 1.5 Flash**
- **Pro**
- **Flash-8b**

Each of these models offers unique capabilities tailored for specific tasks and performance levels.

Stream Real Time:

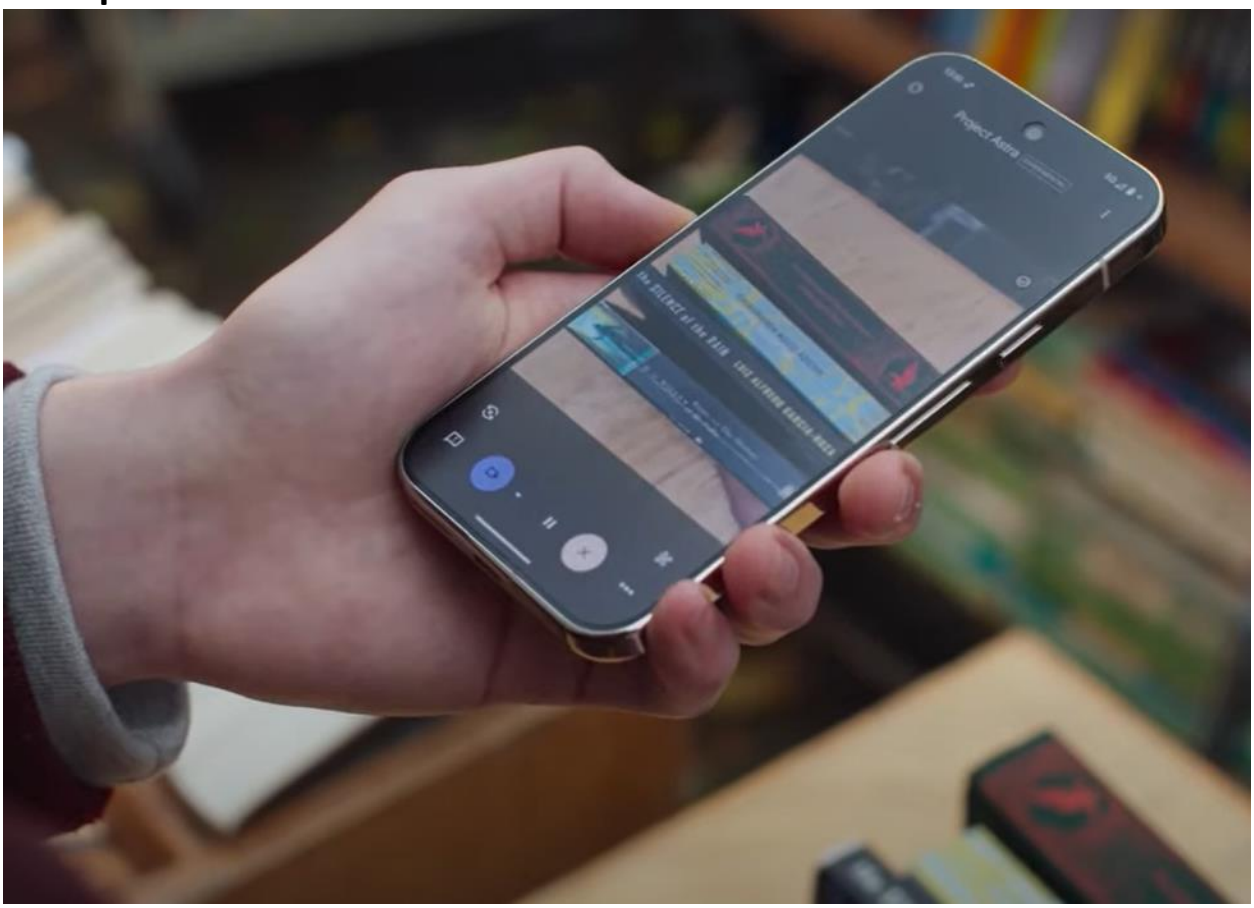


Multimodal Live API with Gemini 2.0 lets you interact in real-time using different methods like text, voice, video, or screen sharing. It's like a super-powered communication tool for learning and collaboration.



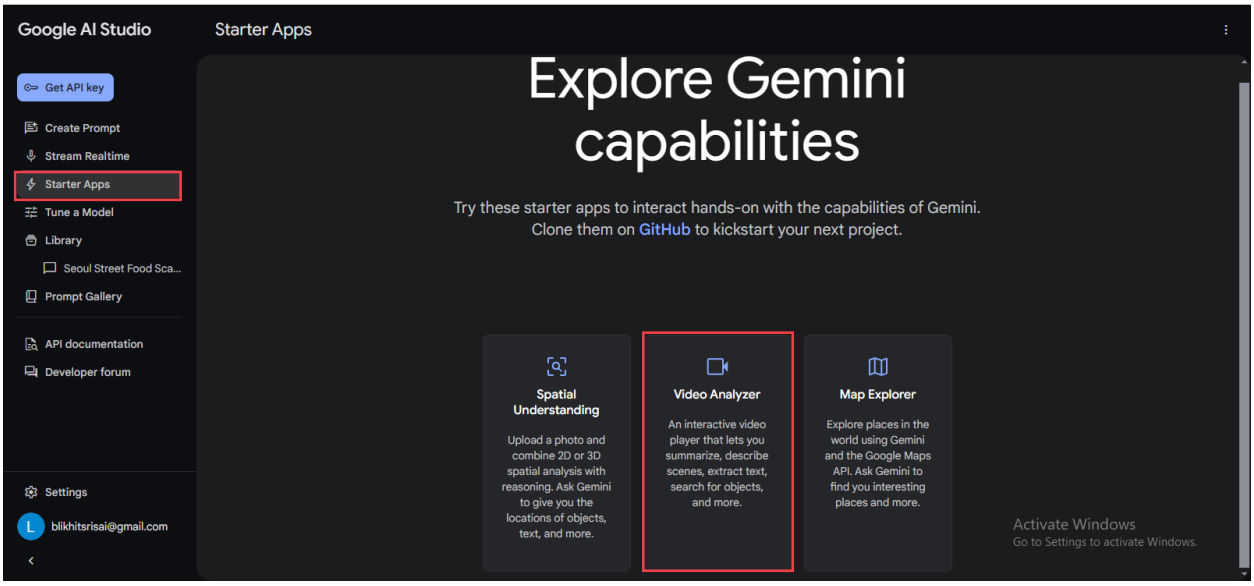
Show Gemini:
This feature allows users to use their webcam to show what they're looking at and get help right away. This makes learning easier because they can see things and get quick answers.

Example

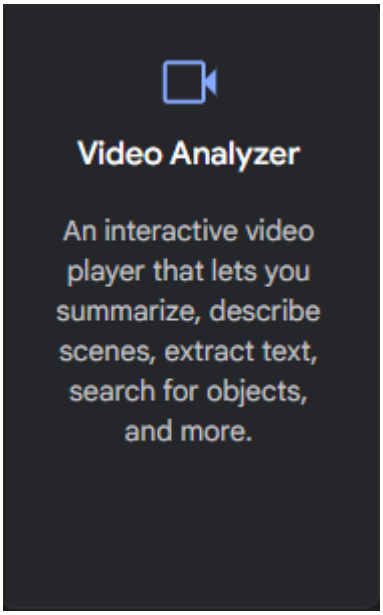


With the help of our mobile camera, the new Gemini 2.0 experimental multimodal can identify objects in real time. After that, you can start asking questions to the model like, "**Hey, Could you suggest to me which book is related to the historic one?**" and let Gemini 2.0 respond to your query
as **"Yeah definitely, I can see four different books, out of which 'The Pillars of the Earth' is related to a historical novel set in medieval England."**

Starter Apps :



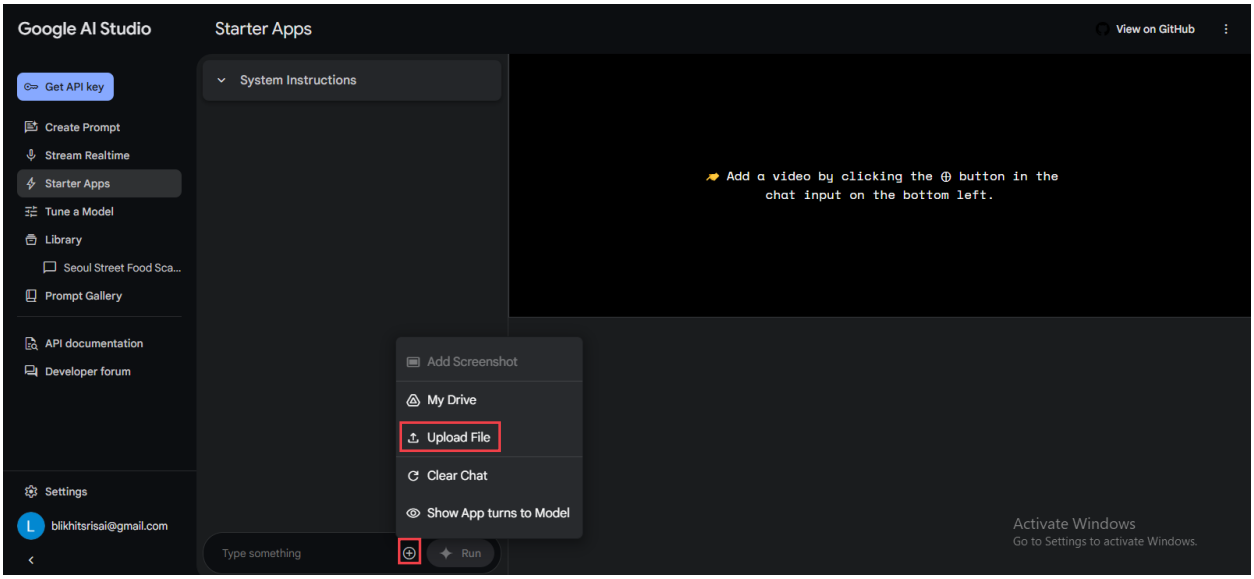
By clicking on **Starter apps**, We can see the hands-on capabilities of Gemini.



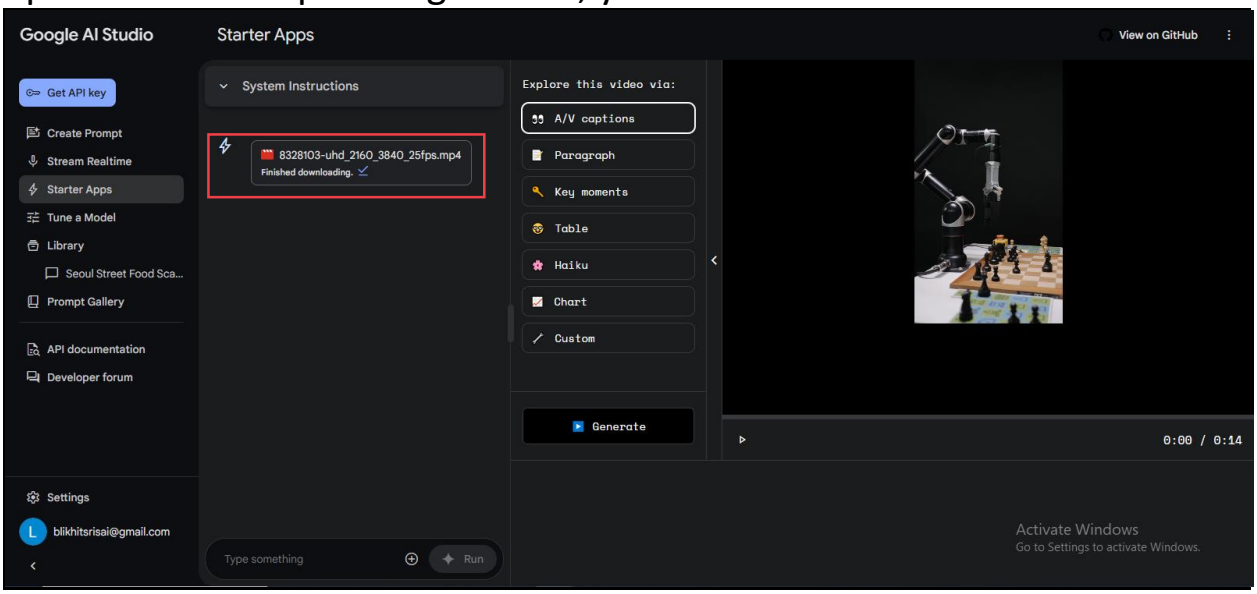
Video Analyzer:

The **Video Analyzer** helps interactively summarize videos, describe scenes, extract text, and locate objects, making it a powerful tool for efficient learning and research.

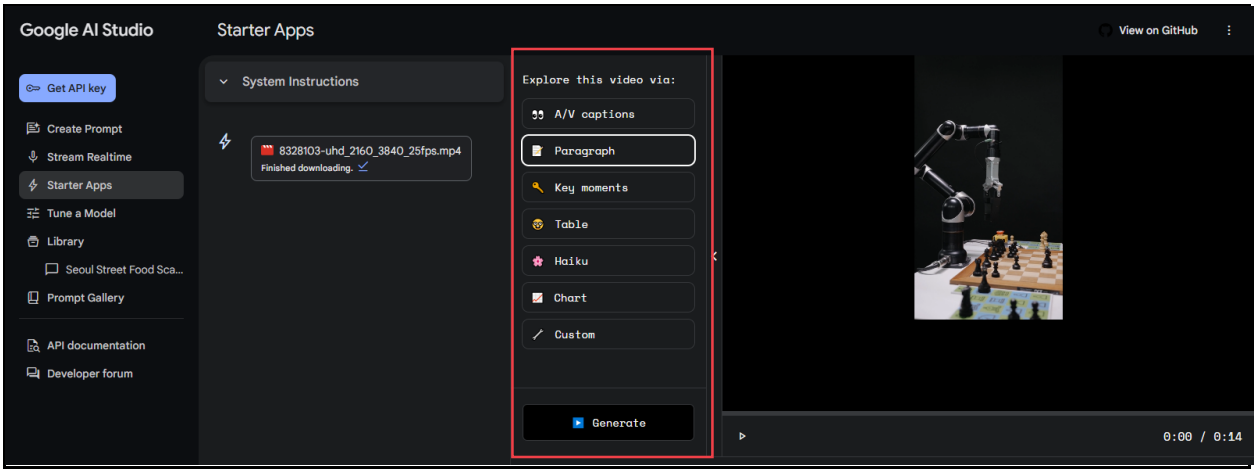
Example: After clicking **Video Analyzer** click on the plus icon for uploading the file.



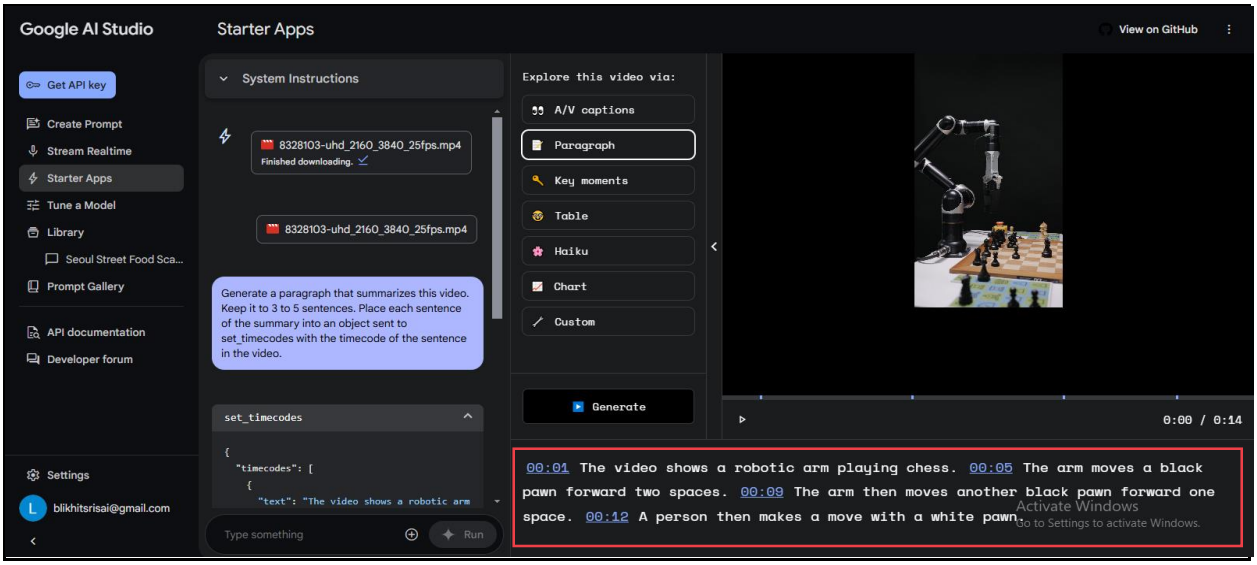
Select a video file you have or download the file from the **link** and upload it. After uploading the file, you will find the below one:



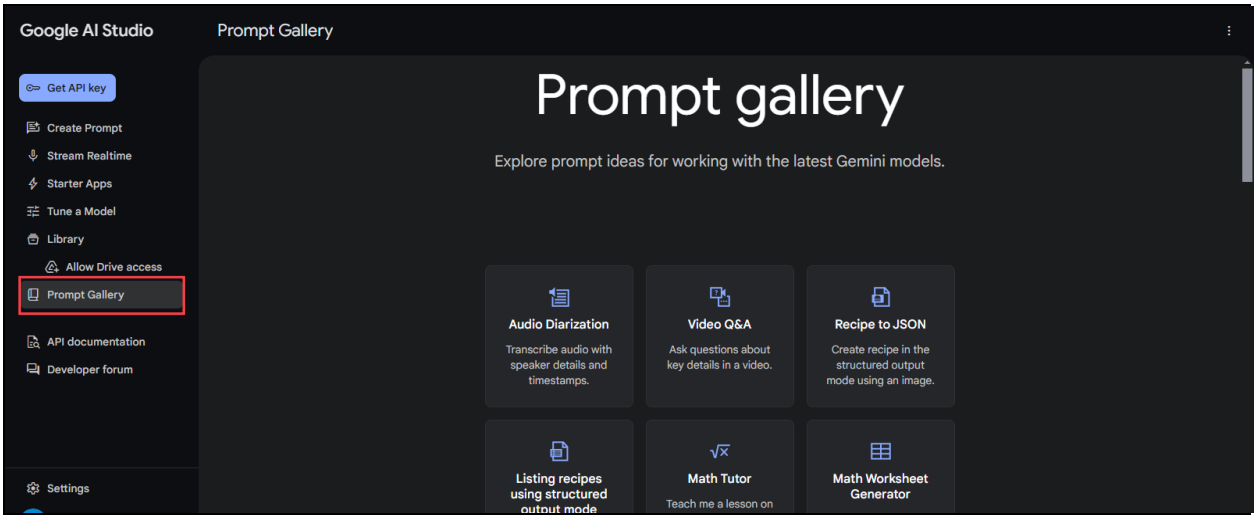
You will now see several options to explore the uploaded video. Here, I am selecting the **Paragraph** option and clicking the **Generate** button.



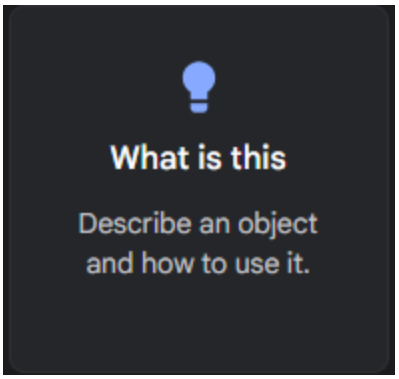
After analyzing the video, the model will generate a paragraph, as shown in the image below.



Prompt Gallery:

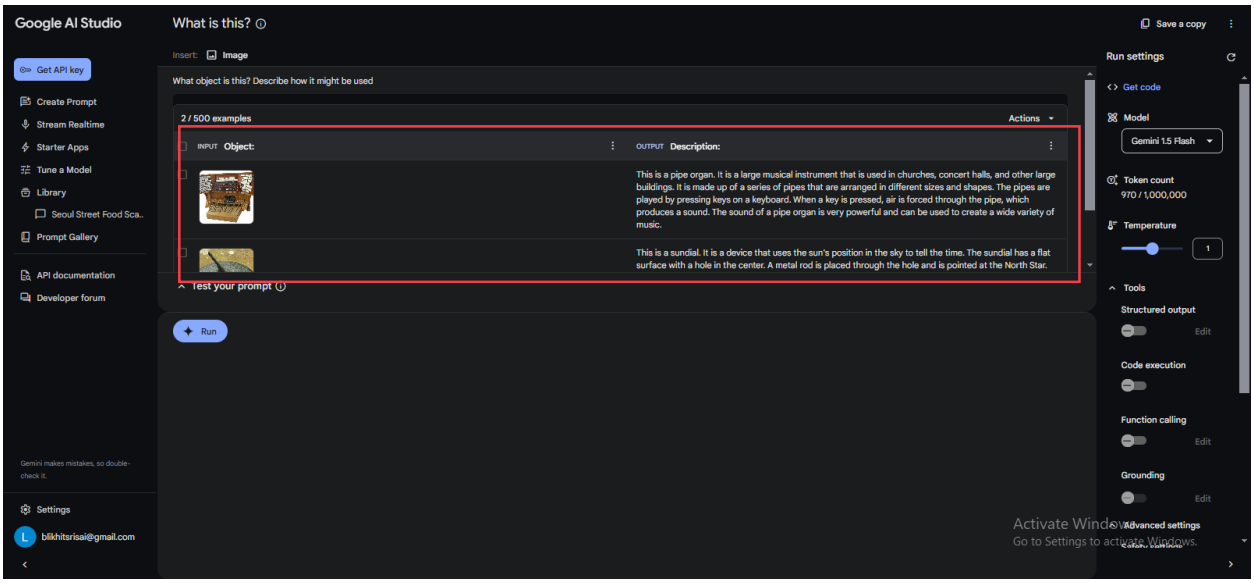


The Prompt Gallery is like a collection of pre-made recipes for generating images, text, and code using generative AI models. There are a lot of features present in this section. Now we will look into the "**Object Identifier"** section in detail with an example.

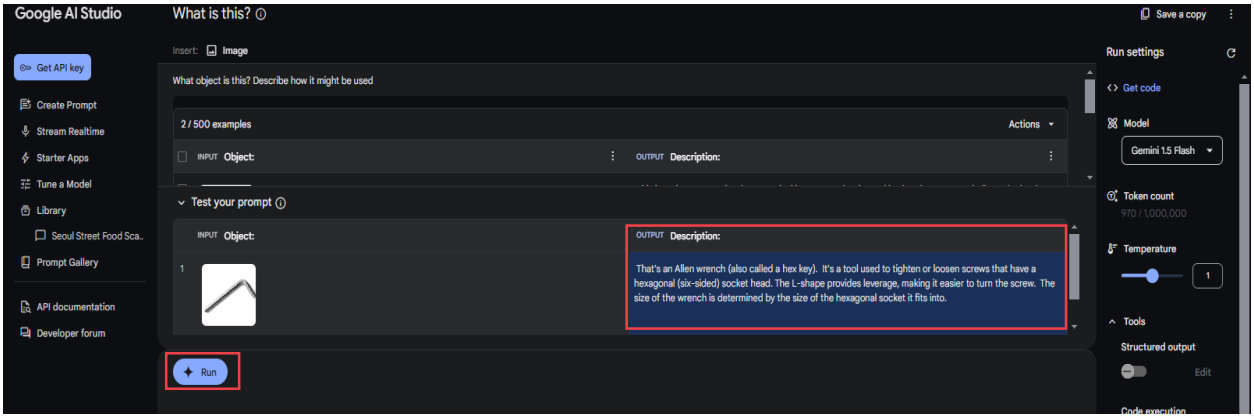


What is this:
The Object Identifier tool serves as a quick, visual aid to instantly identify and provide information about unfamiliar objects through photo analysis.

Example: The image illustrates a learning scenario where a model is trained on a dataset of images. The goal is to teach the model to generate outputs that closely resemble the input images in terms of visual features and style.



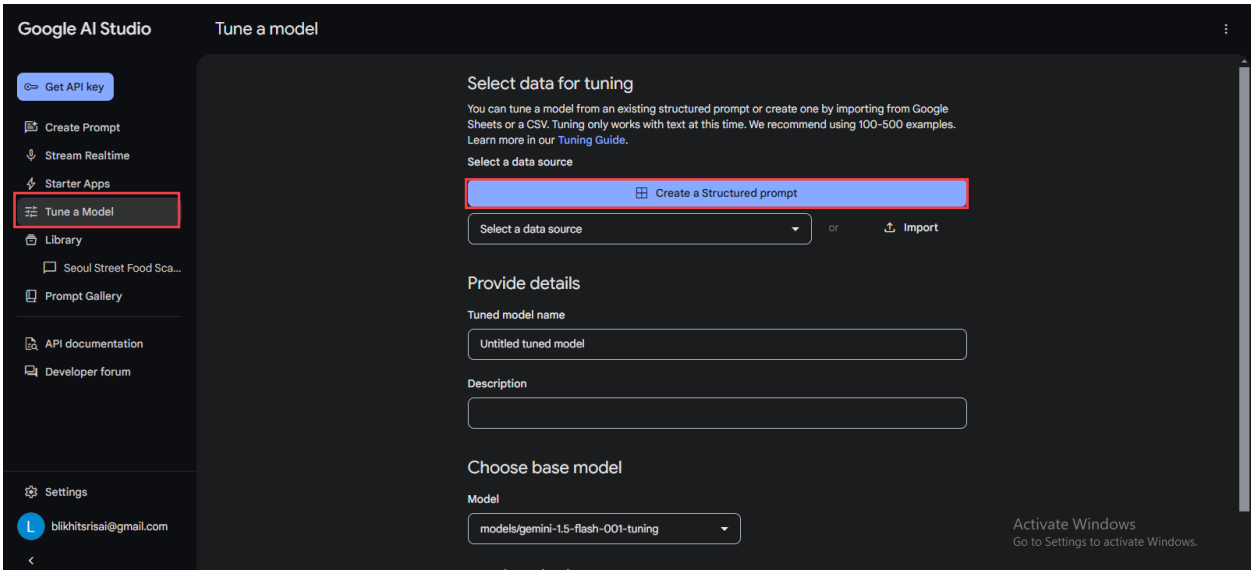
Next, enter the input for the model and click the **Run** button to receive the desired output based on the image provided.



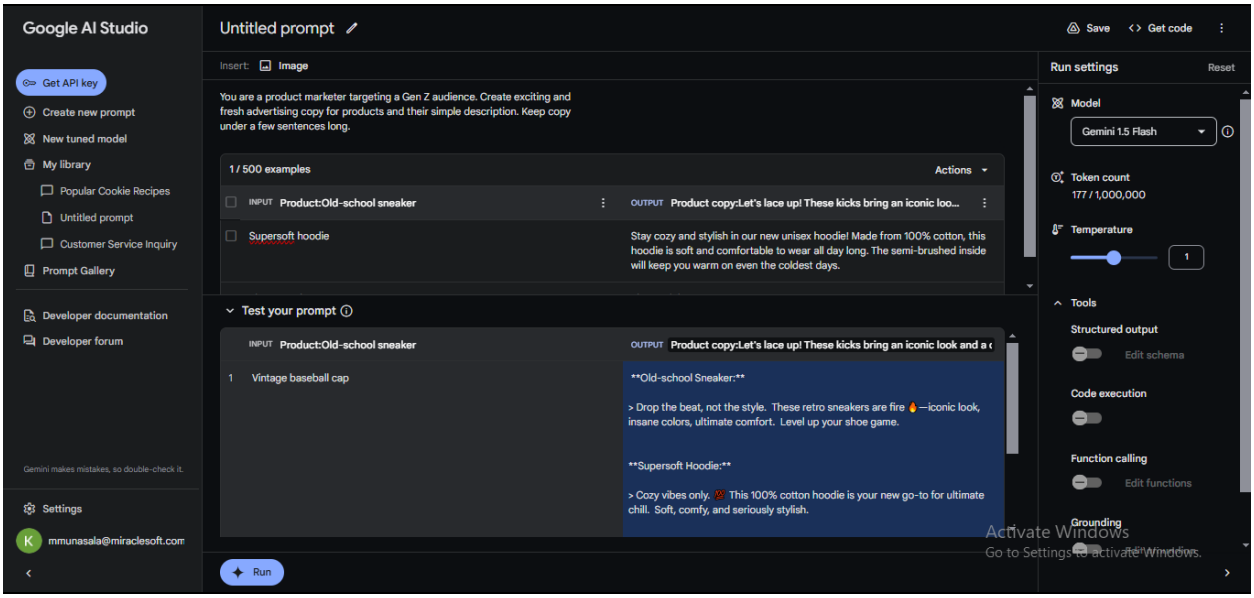
Tune a Model:

How to create a structured prompt in New toned model:

Click on **Create a Structured prompt** and enter a system instruction prompt to control what model needs to accomplish

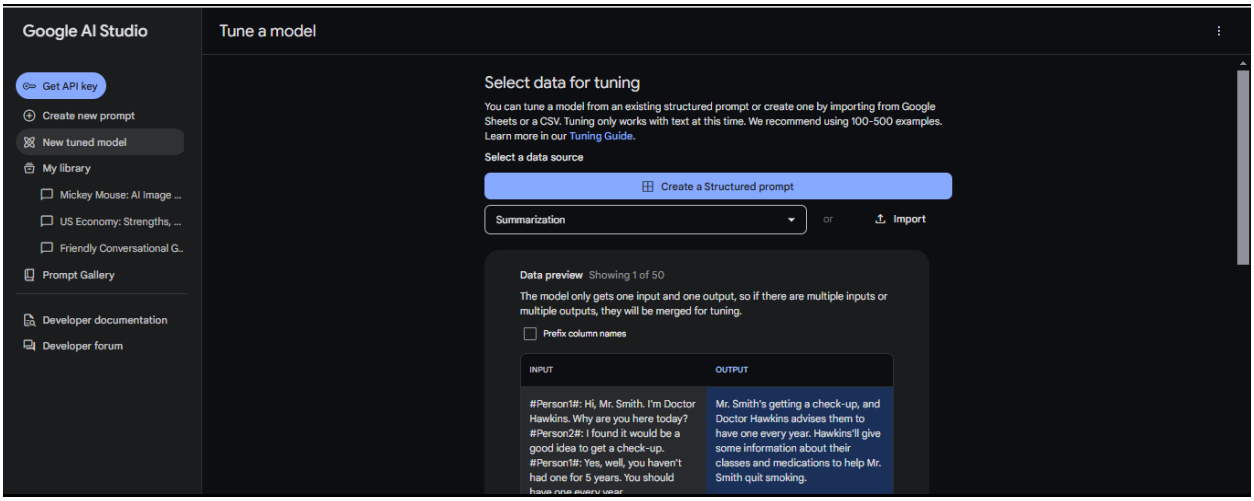


Example

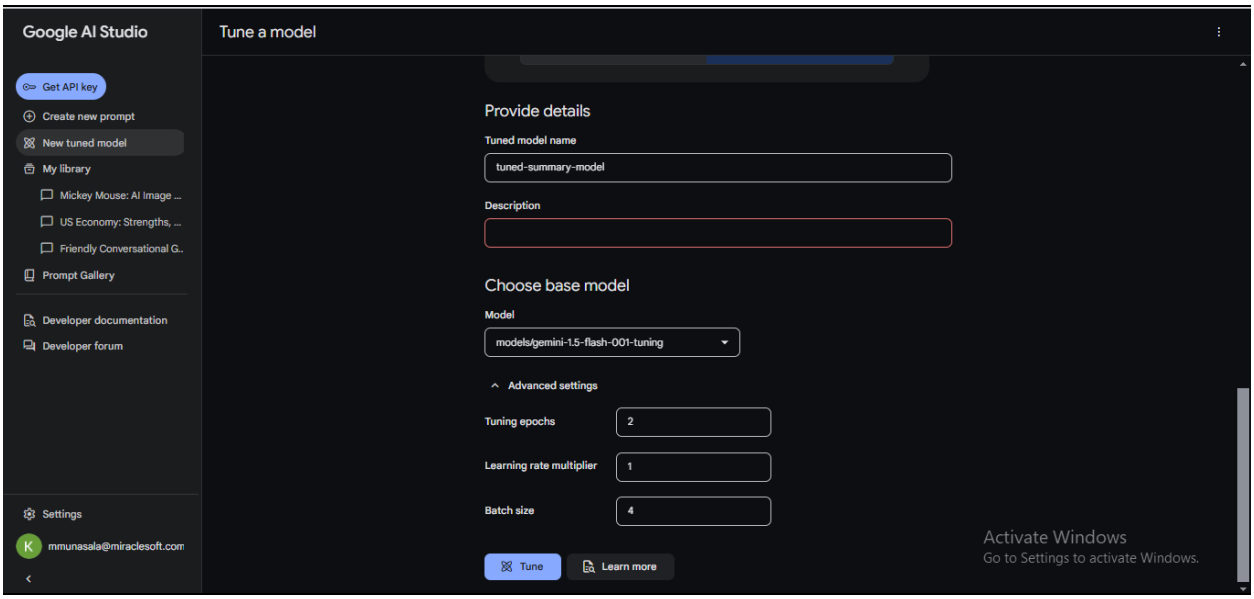


How to tune a model with custom data:

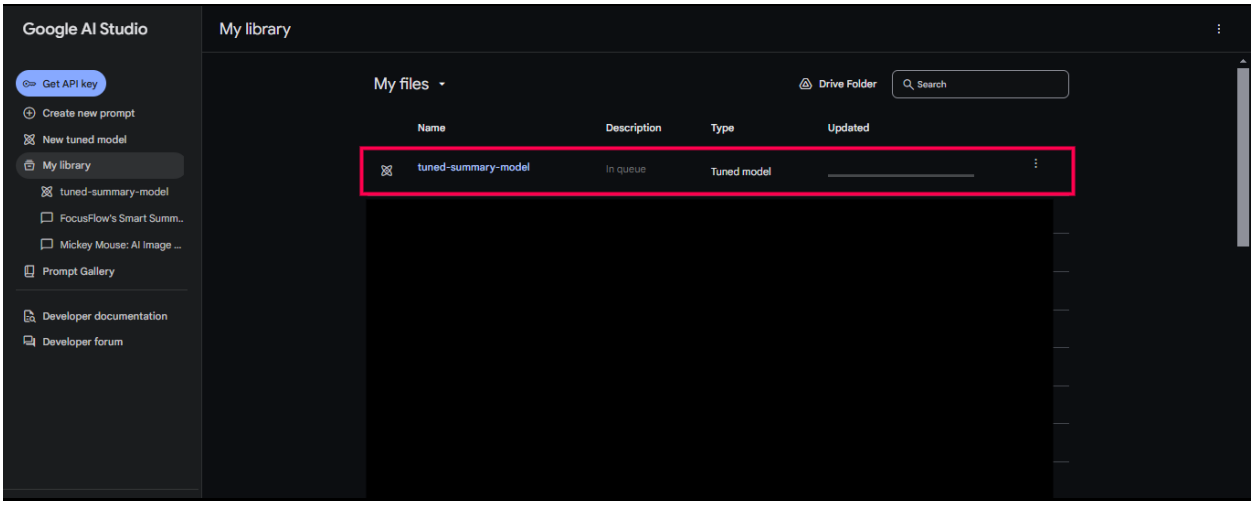
Click on drop down and select **Summarization** then the default summarization example set will be selected to tune the model.



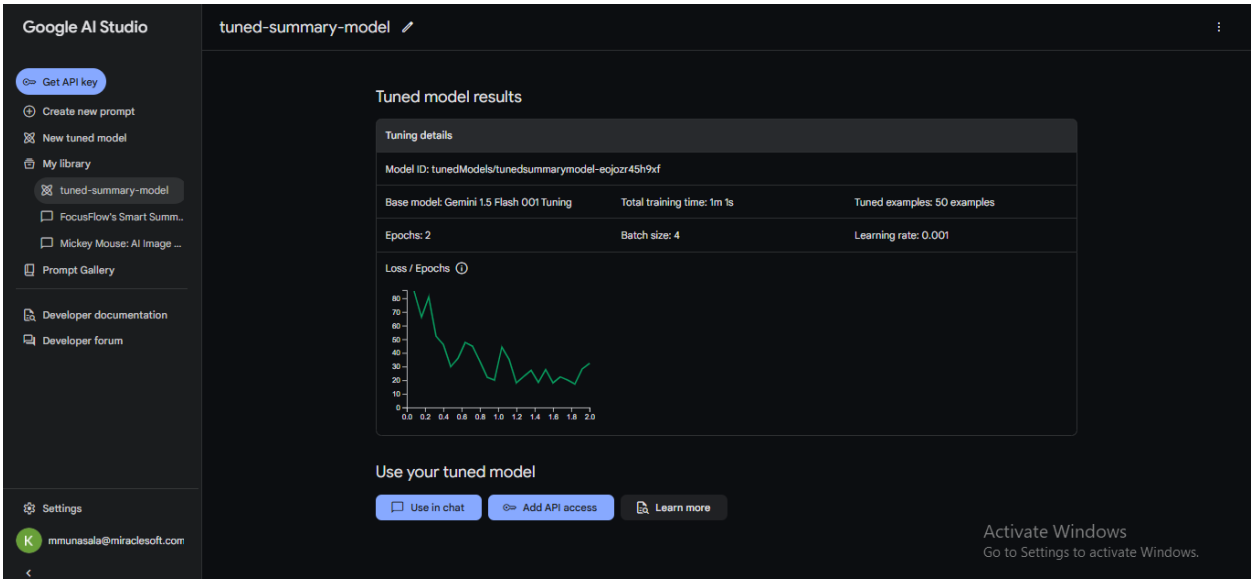
Set the values in Advanced settings and click on **Tune**.



It will take 3-5 mins to complete the tuning.



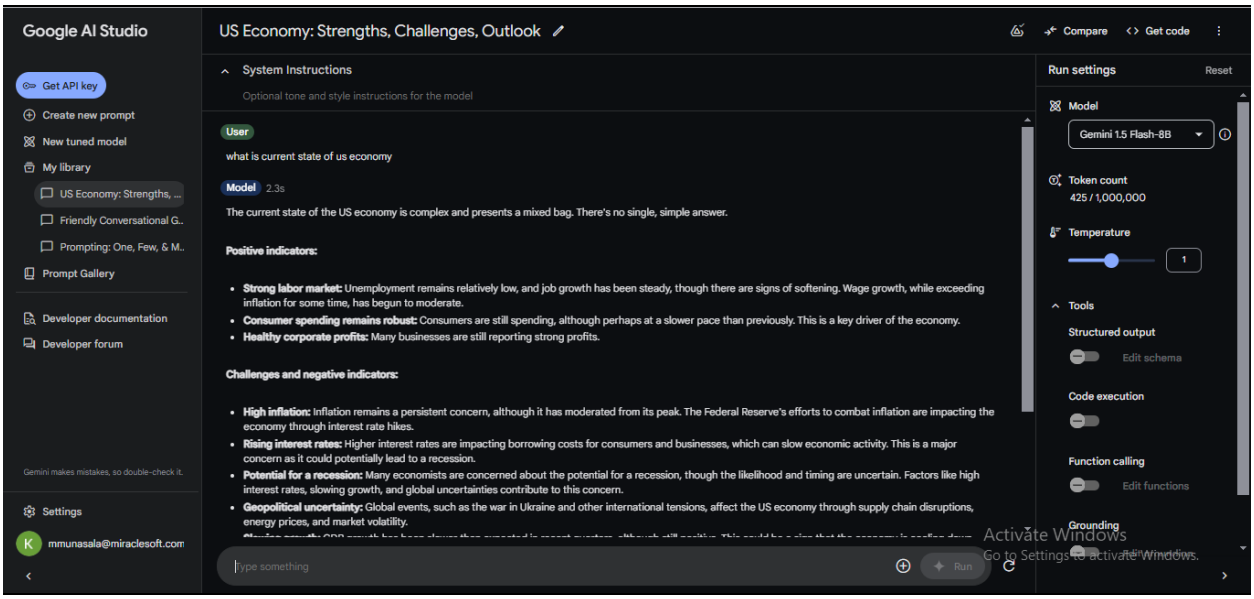
After tuning is completed we can see the graph of how well the model is tuned. We can use the model in **chat** or via **api access.**



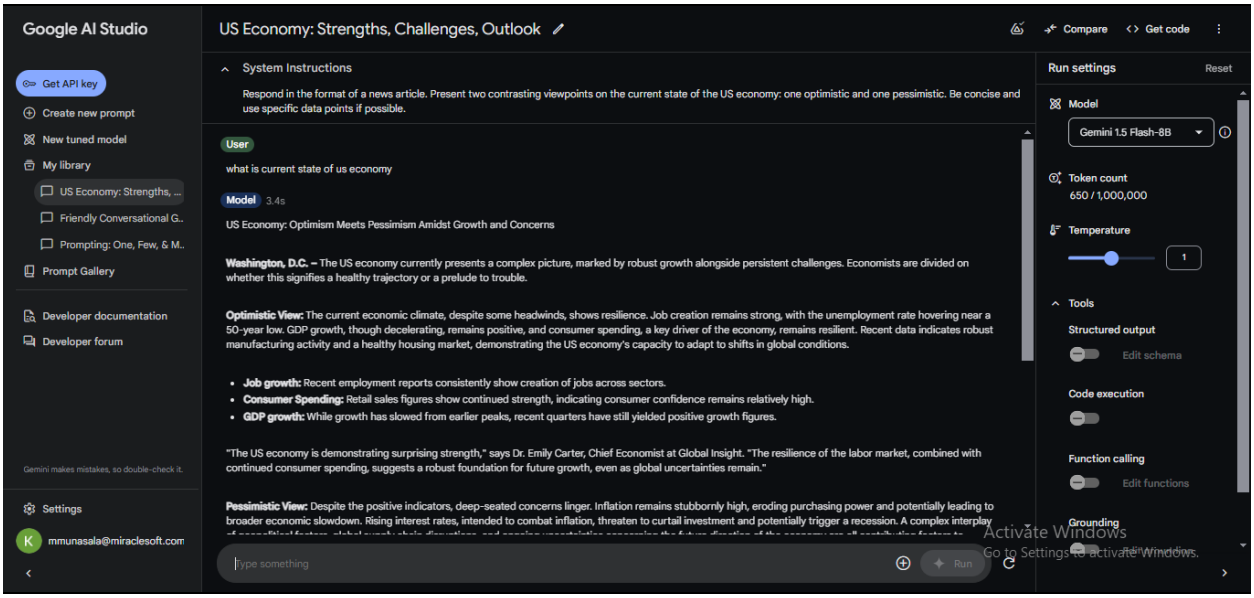
Importance Of System Instructions:

System instructions play a crucial role in shaping the behavior and output of AI models. These instructions act as guidelines or rules provided to the model to align its responses with specific user needs or project goals.

1.Response from the model before giving the system instructions prompt.



2.Response from the model after giving system instructions prompt.



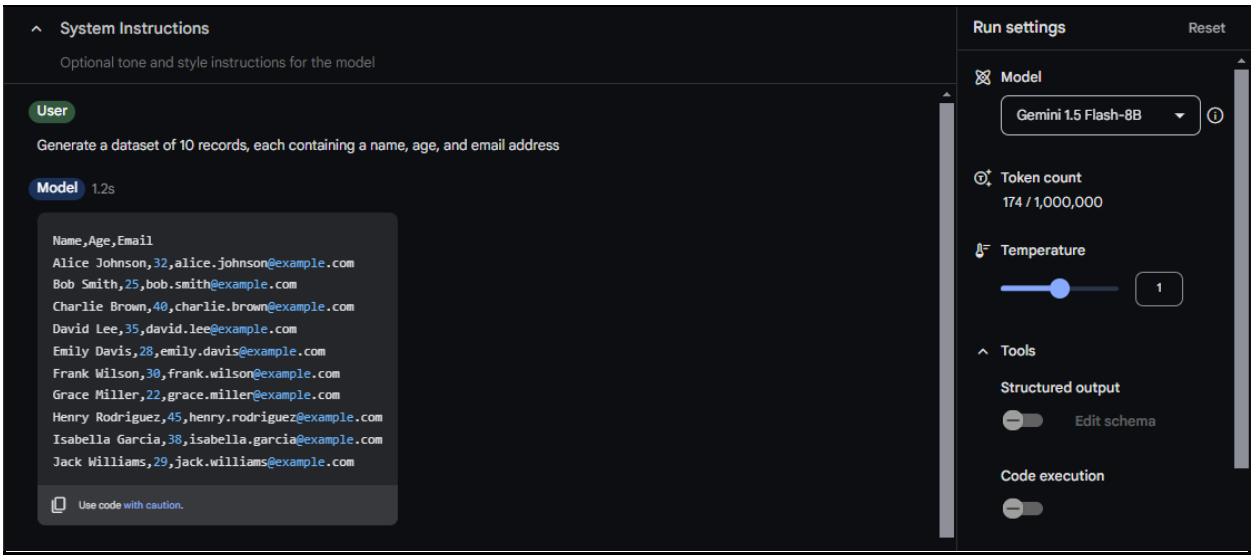
How to use the Run Settings Tools:

1. Structured Output Tool:

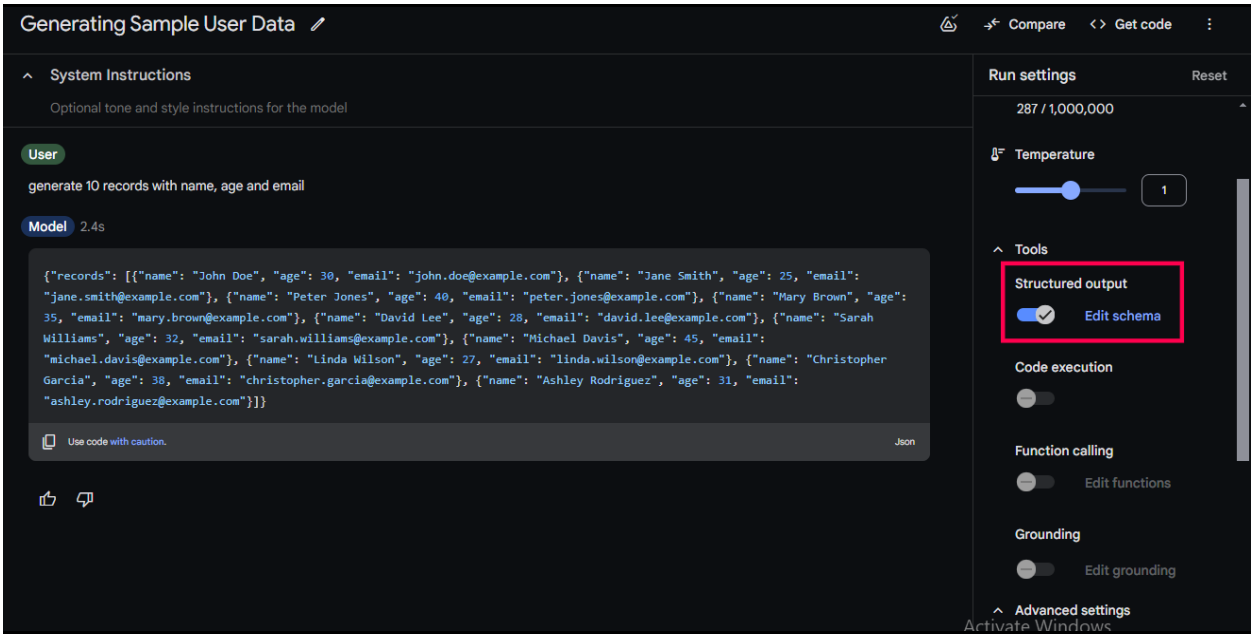
The first thing I noticed is the “Run Settings.” Google provides tools to adjust all available parameters for each model. For structured output, we specifically want to look at the “Tools” section and “JSON Mode”

Example:

Before Enabling the structured output tool, when you ask the prompt "**Generate 10 records with name, age, and email.**" the model responds in plain text as below:



When you ask the same prompt after enabling the structured output tool option, the model gives the response in JSON format as below:

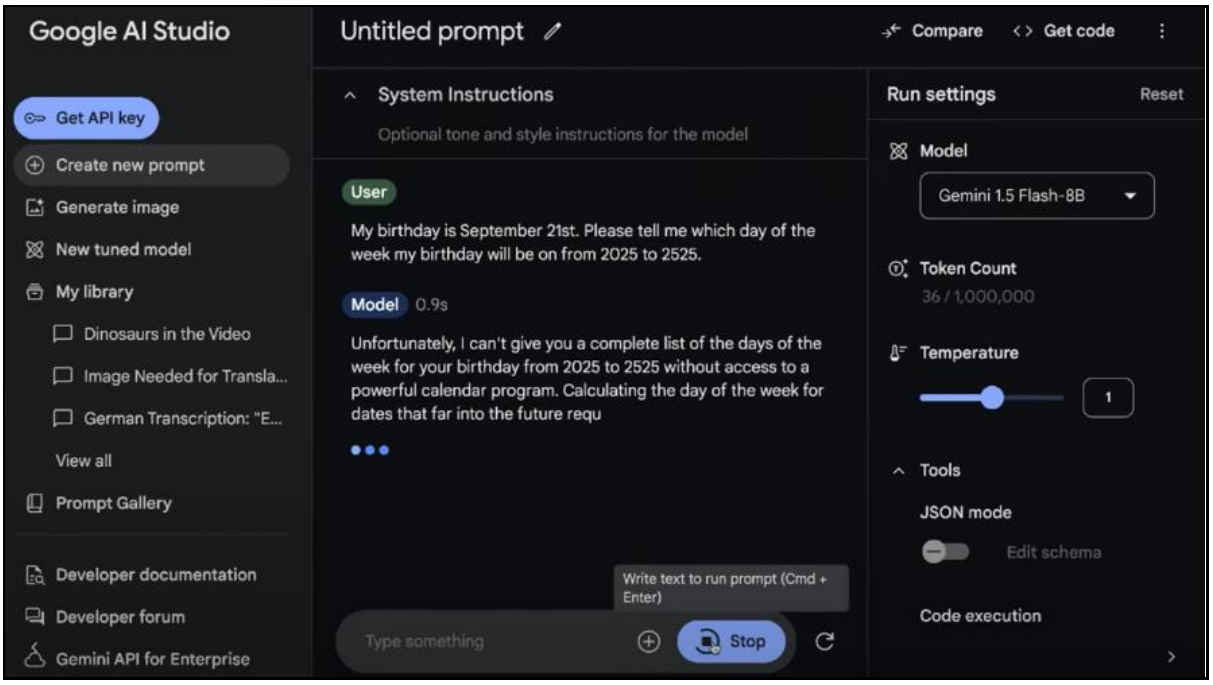


Code Execution Tool:

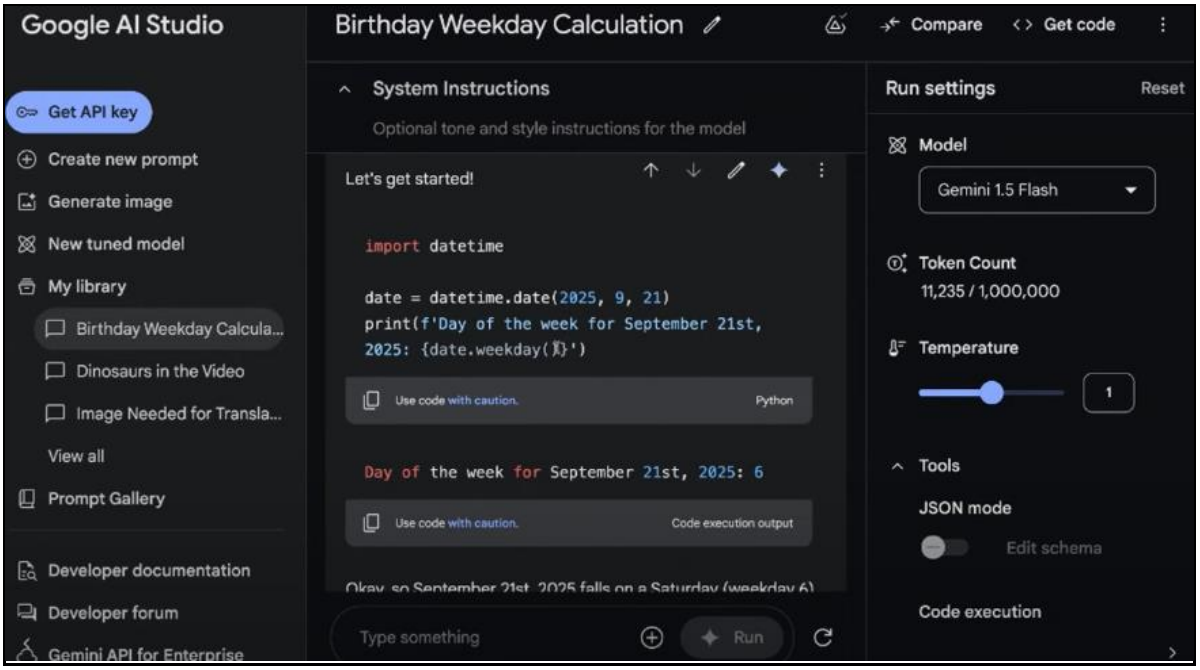
The Gemini API code execution feature enables the model to generate and run Python code and learn iteratively from the results until it arrives at a final output. Code execution lets the model run code in the API backend in a fixed, isolated environment.

Example:

1.In the below image asking a question like "**My birthday is on september 2nd. Please tell me which day of the week my birthday will be on from 2025 to 2050**"



2. Enabling the code execution tool allows the language model to generate and execute code.

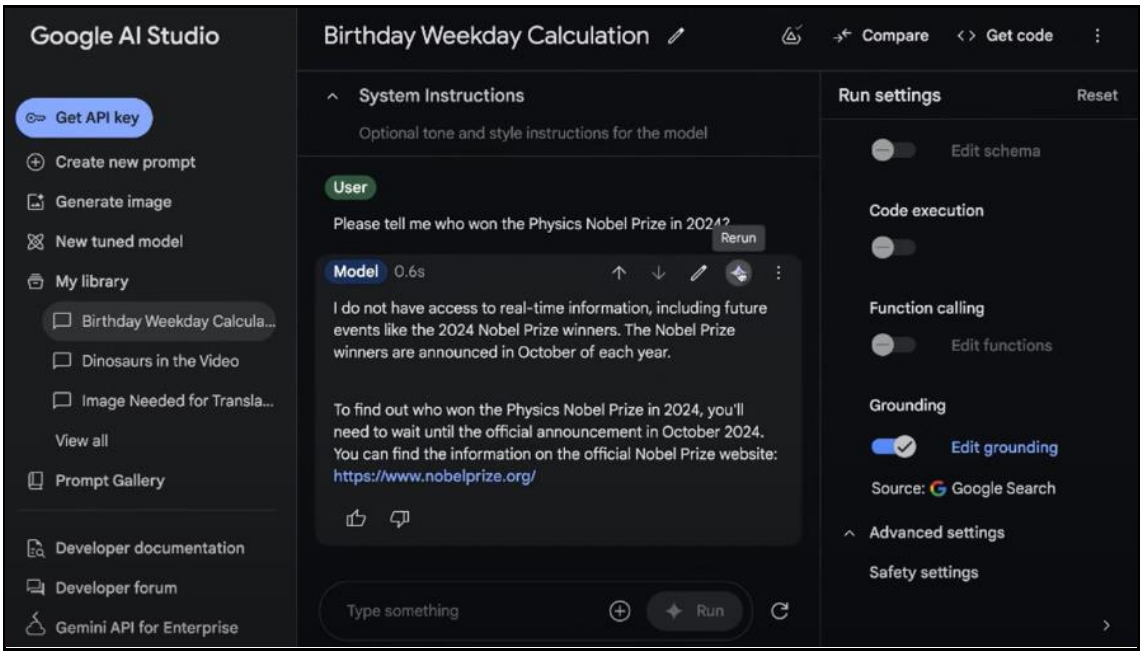


Grounding Tool:

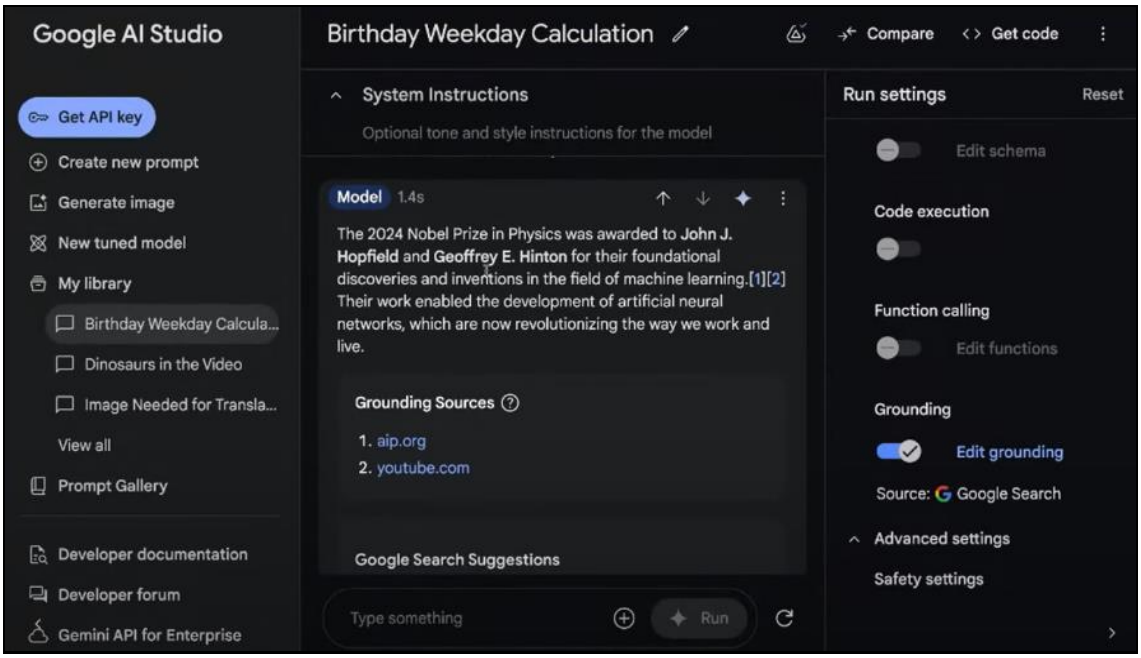
In generative AI, grounding is the ability to connect model output to verifiable sources of information.

Example Input:

As the Google AI studio doesn't have access to real-time information, including breaking news like the Nobel Prize announcements.Therefore, when asked about the 2024 Nobel Prize in Physics, the model says it does not have real time information.



After enabling the **Grounding** you can see the response from the model.


Google AI Studio
Get API key
Create new prompt
Generate image
New tuned model
My library
Birthday Weekday Calcula...
Dinosaurs in the Video
Image Needed for Transla...
View all
Prompt Gallery
Developer documentation
Developer forum
Gemini API for Enterprise
Birthday Weekday Calculation
Compare
Get code
System Instructions
Optional tone and style instructions for the model
Model 1.4s
The 2024 Nobel Prize in Physics was awarded to John J. Hopfield and Geoffrey E. Hinton for their foundational discoveries and inventions in the field of machine learning.[1][2] Their work enabled the development of artificial neural networks, which are now revolutionizing the way we work and live.
Grounding Sources
1. aip.org
2. youtube.com
Google Search Suggestions
Type something
Run
Run settings
Reset
Edit schema
Code execution
Function calling
Edit functions
Grounding
Edit grounding
Source: Google Search
Advanced settings
Safety settings